hold the views which Prof. Hunt has attributed to them in his address. We are glad to know that this is not the usual American method of dealing with authorities.

Gümbel and Credner are the other two claimed supporters of his views. They have sustained Mr. Hunt's opinions as regards the Eozöon and the origin of the serpentine constituting it. But whether they disagree with Haidinger and all others as to pseudomorphs of serpentine, and of other hydrous silicates, I cannot say.

9. That while setting down the Taconic rocks, and rightly, as Lower Silurian in age, he denominates the micaceous gneisses, diorites, epidotic and chloritic, steatitic and serpentinous rocks, talcoid mica schists, quartzites, and clay-slates (which are always without staurolite or andalusite), in fact, the whole range of metamorphic rocks, with small exceptions, between the Connecticut river and the great limestone formation of the Green Mountains (admitted to be Lower Silurian), as the *Green Mountain Series*, and makes the whole "*pre-Cambrian*" in age, although the region has not been examined by any one stratigraphically with the care necessary for a positive opinion; and, although there are gneisses, mica schists, and chloritic talcoid (or mica) schists in the Taconic series, and therefore of admitted Lower Silurian origin, which are closely like those of his Green Mountain Series.

10. That he denominates, in like manner, the gneisses, mica schists (said to be richer in mica than those of the Green Mountain Series), hornblendic gneisses and schists, micaceous and clay-slates containing andalusite, cyanite, or staurolite, and certain limestones, existing east of the Connecticut river, as a *White Mountain Series*, and makes these a newer "pre-Cambrian" than the Green Mountain Series:—when there is the same want of stratigraphical evidence as to age as in the former; and when Prof. C. H. Hitchcock's discoveries of Helderberg corals (Lower Devonian, according to Billings, or else upper beds of the Upper Silurian), at Littleton, not far north of the western extremity of the White Mountain Series, makes it more probable that part of the White Mountain Series of beds are of Helderberg age rather than pre-Silurian; and his discovery of labradorite rocks on the south-western margin of the White Mountains, wholly unlike any of the so-called White Mountain Series, shows further that a vast amount of study in the field is needed before the dictum of any one respecting the age of New Hampshire rocks is worth much.

It is now proved that there are labradorite rocks in Waterville and Albany, N.H., on the borders of the White Mountain region, which are *probably* of *Laurentian* age; that on the other side of the White Mountain line, but 25 miles to the north-northwest, there are fossil-bearing, metamorphic rocks of the *Helderberg* (upper or lower) period; that 100 miles south-southwest, in Bernardston, Mass., or central New England, there are other fossil-bearing metamorphic *Helderberg* rocks, some of the well-preserved crinoidal stems (as the writer has seen, as well as read of in the account of Prof. Hitchcock) *an inch in diameter*. Who then knows whether all, or any, of the long intermediate periods of geological time, from the Laurentian to the Devonian, are represented in the New Hampshire metamorphic rocks lying between these limits? When observation has given positive knowledge, we may then have several "White Mountain Series."

11. That he has relied, for his chronological arrangement of the crystalline rocks of New England and elsewhere, largely on lithological evidence, and commends this style of evidence, when such evidence means nothing until tested by thorough stratigraphical investigation. This evidence means something, or probably so, with respect to Laurentian rocks; but it did not until the age of the rocks, in their relations to others, was first stratigraphically ascertained. It may turn out to be worth something as regards later rocks when the facts have been carefully tested by stratigraphy. A fossil is proved, by careful observation, to be restricted to the rocks of a certain period, before it is used—and then cautiously—for identifying equivalent beds. Has anyone proved by careful observation that crystals of staurolite, cyanite, or andalusite, are restricted to rocks of a certain geological period? Assumptions and opinions, however strongly emphasised, are not proofs.

It is no objection to stratigraphical evidence that it is difficult to obtain; is very doubtful on account of the difficulties; may take scores of years in New England to reach any safe conclusions. It must be obtained, whatever labour and care it costs, before the real order and relations of the rocks can be known. Until then, lithology may give us guesses, but nothing more substantial.

Mr. Hunt's arguments with reference to the White Mountain Series, as urged by him in 1870, will be found in *Silliman's Journal*, ii. l. 83. Both there, and in his address, may be seen the kind of evidence with which he fortifies, or supplements, that based on the character of the rocks. Direct stratigraphical investigation over the region itself, in which all flexures, faults, and unconformabilities have been thoroughly investigated, is not among the foundations of opinion which he brings forward.

He endeavours to set aside the objections to his views suggested by the existence of Devonian or Helderberg rocks in central and northern New England; but he presents, for this purpose, only some general considerations of little weight, instead of definite facts as to the extent and variety of the metamorphic strata that are part of, because comformable to, these Helderberg beds. Had he studied up these stratigraphical relations with the care requisite to obtain the truth, and all the truth, perhaps he would no longer say—it is "contrary to my notions of the geological history of the continent to suppose that rocks of Devonian age could in that region have assumed such lithological characters." Notions often lead astray. JAMES D. DANA

NOTES

THE Royal Horticultural Society has taken a step which may prove very advantageous to the interests of science, namely, the appointment of a botanical Professor, who, by lectures, answers to personal inquiries, and other means, shall assist in establishing a more correct knowledge of the principles of botany and horticulture, and of the names of plants, among those of the Fellows and their gardeners who are desirous to profit by the opportunity. Among the duties of the Professor of Botany will be to conduct the scientific business of the society, both horticultural and botanical; to enter into communication with horticultural and botanical establishments at home and abroad; to conduct the meetings and edit the publications of the society; to give courses of lectures on scientific botany to the gardeners and others; and to have a general superintendence of the gardens at Chiswick. The appointment to this office of Mr. W. T. Thiselton-Dyer, late Professor of Botany at the Royal College of Science, Dublin, is a guarantee that the cultivation of scientific botany will not be neglected.

DR. DAVID FERRIER has been appointed Professor of Forensic Medicine at King's College, London, *vice* W. A. Guy, M.B., resigned.

THE Secretary of State for India has appointed Mr. A. G. Greenhill, Fellow of St. John's College, Cambridge, Professor of Applied Mathematics at the Civil Engineering College, Cooper's Hill. Mr. Greenhill graduated as Second Wrangler in 1870, and was bracketed equal with the Senior Wrangler for the Smith's Prize; he also gained a Whitworth Scholarship while an undergraduate.

THE Radcliffe trustees at Oxford, anxious to aid one or more advanced students in the scientific study of preventative or curative medicine, offer 10*l.* a month, for three months, to a student of St. Bartholomew's, Guy's, or St. George's Hospitals, desirous of working for that time in Oxford. He will have opportunities of studying physics, chemistry, geology, the higher parts of biology, clinical and sanitary medicine. Candidates must be recommended on intimate personal knowledge by the Dean or secretary of their medical schools, and will not be submitted to an examination. The first election will be in the last week of February. There will be an election of another student in April.

A GENTLEMAN named Millard has bequeathed to the President and Fellows of Trinity College, Oxford, 8,000*l.* for the advancement of mathematical and general science.

THE University of St. Andrew's has conferred the degree of LL.D. on Mr. Archibald Cunningham Geikie, Professor of Mineralogy and Geology in Edinburgh University.

THE Royal Irish Academy have granted from the fund at their disposal for scientific research, the following :—50*l.* to C. R. C. Tichborne, for Researches on the Dissociation of Salts in hot solutions, and on the History of the Terebenes; 30*l.* to E. T. Hardman, for Chemico-Geological Researches; 25*l.* to Prof. R. S. Ball, for Researches in the Motion of Vortex Rings; 25*l.* to Prof. S. Downing, for Researches on the Motion of Water through Curved Tubes; 50*l.* to P. S. Abraham, for Biological Researches on the Coast of Madeira.

ROBERT PATTERSON, F.R.S., died at his residence, Belfast, on the 14th. He was born in April 1802. Educated at the Belfast Academy, in his early days he contemplated the Irish Bar as a profession, but finally devoted himself to mercantile pursuits. At a very early age he was an ardent student of Natural History, and in 1821 he joined with a few others to form the Natural History Society of Belfast. Among the first papers read before this Society were a series by Mr. Patterson on the insects mentioned by Shakespeare, which were afterwards published. His most important contribution to biological literature was, perhaps, his "Zoology for Schools," the first part of which appeared in 1846. This little work proved a great success. It was adopted by the Commissioners of Irish National Schools, and also by the Committee of Education in England, and most certainly gave a great impulse to the study of Zoology among the school classes of Great Britain. This led to the issue in 1853 of "Zoological Diagrams," large coloured plates which have proved of material assistance to both the teacher and the taught. He was a member of the British Association in its early days, and we believe that the daily printed "Journal of Proceedings" was an idea that originated with him. Of the different positions of honour and trust held by Mr. Patterson in his native town, we need not here speak. He was elected a member of the Royal Irish Academy in 1856, and a Fellow of the Royal Society in 1859. His genial and kindly presence will be missed by very many of his old and young friends.

Harper's Weekly notes the death of Mr. W. Harper Pease, at Honolulu, about the last of July, 1871. This gentleman was an American, born, we believe, in Pennsylvania, and was occupied for a long period in natural history pursuits. During the Mexican war he visited that country, under the protection of the American army, and made extensive collections of birds, which were deposited in the Academy of Natural Sciences at Philadelphia, among them some new species described by Mr. Cassin. About the year 1853 he visited the Sandwich Islands, and occupied himself for a time as a surveyor, and was sufficiently well pleased with the climate and country to remain there, marrying a native, and adapting himself to the customs of the people. During the whole of his residence in Polynesia he was engaged in studying the mollusca of the Sandwich Islands, and gradually extended his research to the species of all the Polynesian group, making collections either directly or through the medium of Mr. Garrett and others. Numerous communications from his pen upon Polynesian conchology have appeared in the *Journal de Conchologie* of Paris, the *Conchological Journal* of Philadelphia, the Proceedings of the Zoological Society of London, and elsewhere, and he has long been recognised as a thorough naturalist and reliable author. He had accumulated around him at Honolulu a very large library of conchological works, which, indeed, lacked few if any of the more important treatises. He enriched the principal cabinets of America and Europe by furnishing extensive collections, by which means he obtained, in part, the facilities for procuring the books needed for his investigations. He was for several years in ill health, and his death by consumption was not at all unexpected by his friends.

WE also learn from *Harper's Weekly* of the death in Reading, Pennsylvania, on December 26, 1871, of Mr. Charles Kessler, in the sixty-sixth year of his age. Mr. Kessler was known as an ardent and successful student of entomology, devoting himself to the lepidoptera, or butterflies, and bringing together a very large collection of insects of this order. We have not heard what disposition is to be made of this collection, but we presume it will ultimately come into the possession of some one of the natural history museums of the country.

PROF. WYVILLE THOMSON has been prevented from lecturing to his students for the past fourteen days, owing to a mild attack of continued fever. He hopes, however, to be able to begin again on Wednesday next. Dr. Christison has also been laid up for some days, owing to an attack of ephemeral fever.

WE learn from the *Academy* that the African traveller and botanist, Dr. Schweinfurth, has happily returned in safety to Europe, and though he has suffered the loss of the greater part of his invaluable collections and drawings, he has brought back a harvest of information and experience which places his journey among the most successful of modern times. After his great journey west of the Upper Nile, in the country of the Niam-Niam and Monbuttu, he made a short excursion from his headquarters, the Seriba Ghatta, westward to Kurkur and Danga, positions formerly visited by Petherick, and returning, planned a much more extended journey, when a fire broke out in the Seriba Ghatta on the 2nd of December, 1870, which not only destroyed the station, but with it the whole property of the traveller. Fortunately, a portion of his collection was at that time already on its way to Berlin. Provided with a few necessaries at Seriba Siber, the headquarters of the Egyptian troops, the indefatigable traveller made a tour in a part of Fertit hitherto unvisited by Europeans from December 1870 to February 1871, during which he found that the Bachr-el-Arab is unquestionably the main stream of the basin which mouths in the Nile at the Bachr-el-Ghazal. Having been deprived by the fire of every instrument by means of which any mechanical reckoning of the distances traversed during this journey could be made, the explorer, with an energy perhaps unexampled, set himself the task of counting each step taken, and in this way constructed a very satisfactory survey of his route.

Harper's Weekly announces the receipt of advices as late as the 5th of November from Mr. William H. Dall, whose return to Alaska under the auspices of the Coast Survey we have already chronicled. Mr. Dall is well known for the encyclopædic work published by him some time ago upon Alaska, the result of several years' residence in that region. His present position gives him unusual advantages for observation and research, and will doubtless be made the most of in gathering an important mass of information. He is now stationed at Iliuliuk, in Unalaska, and engaged in surveying harbours and taking soundings, and generally in gathering such information as to the shores and their adjacent waters, the tides and currents, as will be to the interest of commerce and navigation. He is also using his opportunities in dredging for marine animals, and in making collections of natural history, of which he has already accumulated quite a number.

THE first contribution to science from the *Hasler* expedition, under Prof. Agassiz, appears in the form of a letter addressed to Prof. Peirce, dated St. Thomas, December 15. In this it is stated that, in the course of the frequent examination of the floating Gulf-weeds made daily, for the purpose of collecting the marine animals that usually inhabit them, a mass of this weed was found, the branches and leaves of which were united together by fine threads, wrapping it in every direction into the form of a ball. The threads forming the connecting material were elastic, and beaded at intervals; the beads being sometimes close together, sometimes more remote, a bunch of them occasionally hanging from the same cluster of the threads. From the accounts of the professor it would appear as if a globular mass had been formed by wrapping up a small quantity in the thread, and then adding more, and continually wrapping it up, until a ball of considerable size was produced. A careful examination of these beads showed that they were in reality the eggs contained in the substance of the threads, and in some the embryo was sufficiently far advanced to prove that they belonged to a fish. The mass was preserved and watched until some became detached and were free in the water; and by a very interesting process of critical investigation, the fish itself being too small for identification, it was ascertained, mainly through the structure of the pigment-cells, that they belonged to a small species, quite common in the Gulf Stream, known as *Chironectes pictus*. In this genus the pectoral fins are supported on arm-like appendages, giving them the power of hands; a somewhat similar structure in some allied forms enabling them, when thrown on the shore, to walk or crawl back leisurely into the water. It is somewhat remarkable that these eggs should have been found in the month of December, when the great majority of species lay their eggs in early spring. It is possible that *Chironectes pictus* may be an exception to the general rule. A scarcely less interesting peculiarity is seen in regard to the eggs of the goose-fish, or the common fishing-frog, of the Atlantic coast. This is an extremely hideous-looking species, shaped like a much-depressed tadpole, with an enormous head and huge mouth, and sometimes weighing from fifty to one hundred pounds. It is known to naturalists as *Lophius americanus*. The eggs of this species are contained in an immense flat sheet of mucus, sometimes thirty or forty feet long, and twelve to fifteen wide, which, when floating along the surface of the ocean, resembles nothing so much as a lady's brown veil. The mucus is so tenacious as to admit of being wrapped around an oar and dragged on board a vessel, but is extremely slippery, and readily escapes from one's grasp. The eggs, or embryos, are disseminated throughout this sheet at the rate of ten to twenty to the square inch, and by their brownish colour tend to give the impression just referred to. The number of eggs in one of these sheets is enormous, in some instances exceeding a million.

THE *Gardener's Chronicle* inquires whether the physicians or the lecturers on Botany at St. Thomas's Hospital and King's College Hospital, London, respectively, have been consulted as to the planting that has been lately carried on in the enclosures facing the buildings we have mentioned. We can hardly suppose that these gentlemen can have had any voice in the matter, since they must be too good physiologists not to know what must be the inevitable result of such operations. At St. Thomas's the expenditure for evergreen shrubs must have been very considerable. There are scores of such things as *Libocedrus decurrens*, *Cupressus Lawsoniana*, *Thujopsis borealis*, *Wellingtonia*, and the like, which are certain to die. The selection of evergreen shrubs for the Thames Embankment (north) is sufficiently unfortunate, but for reckless planting commend us to the Hospital of St. Thomas. At King's College Hospital the planting has been more modest, the victims consisting merely of cherry laurels. Surely we might have looked for a little common sense in such establishments as we have alluded to.

AT the Wisbech District Chamber of Agriculture, held on February 1st, some very interesting remarks were made by Mr. S. H. Miller, advocating the establishment of a County Agricultural Laboratory in which chemistry, botany, and agricultural meteorology might be prosecuted, in which young farmers might get a scientific training, and to which soils and manures might be sent for analysis. The warmth with which the proposal was received by those present augurs well for the manner in which subjects of this kind are now taking hold of the agricultural and commercial mind. We heartily commend the subject to the attention not only of Chambers of Agriculture, but of Chambers of Commerce throughout the country.

EQUALLY satisfactory was the reference made at the half-yearly meeting of the Scottish Meteorological Society, held on January 25th, by Mr. Milne Home and Mr. Melvin, to the extent to which this country is lagging behind in its endeavours to increase our knowledge in scientific agriculture. The following resolution was passed at the meeting:—"This meeting having had explained to it a scheme proposed by Commodore Maury, of America, for obtaining reports from all countries of the state of growing crops, and also of the weather in the districts where these crops are growing, so as to warrant correct estimates of these crops as regard both quantity and quality; and having learnt that an influential agricultural society in America has approved of the scheme, and applied to the United States Government to carry it out, and to invite the co-operation of the Governments of other countries, agree to express a general approval of the scheme, and remit to the Council to make a favourable answer to Commodore Maury's communication."

AT the recent annual *conversazione* of the Sheffield Literary and Philosophical Society, the annual address was delivered by Mr. H. C. Sorby, F.R.S., as president. Among the remarkable inventions of the year he referred especially to the honour done to the town by Mr. Earnshaw's new method of integrating partial differential equations, and to the invention of the Moncrieff gun-carriage, where, by a simple application of mechanical principles, the force of the recoil is utilised, and made instrumental in protecting the men and the gun, and employed to raise it into a position for the next shot.

THE pages of the "Public Ledger Almanack" are filled with far more sensible matter than usually finds its way into similar publications. We find articles on the atmosphere, on the various descriptions of weather signals, and on the United States Coast Survey.

M. QUETELET reprints a eulogium on the late Sir John Herschel, spoken before the Academy of Science of Brussels, of which he was an associate.

MR. FAIRGREVE, the proprietor of Wombwell's No. 1 Menagerie, is retiring from business, and is going to dispose of the stock. The horses requisite for the dragging of the vans were sold the other day in Edinburgh, and realised over 1,400*l*. This sum gives a slight insight into the large capital invested by the owners of menageries. It is not known what he is going to do with the animals. There is some talk of another Zoological Garden being formed in Edinburgh, but nothing definite.